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ABSTRACT

In the U.S. there has been an increase in the number of outdoor recreationists requiring rescue. While it might seem logical that this trend results from the increasing numbers of outdoor enthusiasts, other factors contribute. Mass media give wide exposure to outdoor activities and use outdoor recreation to market many products and services. Such advertising and televised broadcasts of outdoor sports seldom emphasize the importance of preparation and training and often encourage risk-taking among weekend participants. National Park rangers suggest that rather than learning skills from wilderness veterans, recreationists now jump right into participation and rely on cellular phones to call for help. The increased use of cell phones in the wilderness also means that people launch search and rescue operations casually, without trying to get themselves out of trouble. Even if participants are prepared and use good judgment, certain environments present unique hazards that contribute to accidents, injury, and death. A section on alpine environments discusses recommended equipment for mountain day hikes, numbers of mountaineering accidents per year, primary causes of accidents, contributing factors, and participant age. Contributing factors and accident prevention are also discussed for desert environments, winter activities, and whitewater sports. Contains references and a bibliography. (SV)

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TROUBLE IN PARADISE - ACCIDENT TRENDS IN THE OUTDOORS

BY

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Trouble in Paradise - Accident Trends in the Outdoors

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Abstract

There is an alarming national trend in outdoor activity participation. For the past several years, the number of outdoor recreationists requiring rescue has grown steadily. At one popular national park the number of rescues has increased to over 200 a year (more than one every other day!). In many instances, people believe they are entitled to rescue and simply need to dial 911 on their cell phones when trouble threatens. While it might seem logical that this trend is the result of increasing numbers of outdoor enthusiasts, most experts believe that this does not explain the dramatic increase in the number of people who get into trouble in the outdoors. What are the reasons for the dramatic increase in the necessity of search and rescue operations in our nation's outdoor areas? How can this trend be reversed? This paper will examine a variety of SAR sources to shed some light on the causes of accidents in the outdoors for a variety of environments including: alpine, desert, white water and winter. Both physical and psychological factors will be explored. In addition, techniques for mitigating these causes will be presented with a particular emphasis on improving education for the causal participant.

Search and Rescue Operations on the Increase

John Muir once said, "Climb the mountains and get their good tidings. Nature's peace will flow into you as sunshine flows into trees. The winds will blow their own freshness into you, and the storms their energy, while cares will drop off like autumn leaves."[1] If John Muir believed these words to be true in 1869, think about how relevant they must be in 1998. Today, more and more Americans are taking his advice and traveling to the mountains and natural areas of the United States in search of rest and recreation. Likewise, it seems that more and more recreationists are finding themselves in trouble and in need of assistance. In 1994, rangers at Yosemite National Park launched 231 visitor rescues.[2] Similarly, in 1995 there were 380 rescue operations in Grand Canyon National Park involving 66 National Park Service employees. Twenty three of these incidents involved visitor fatalities. Consider a day in the life of a backcountry ranger in Grand Canyon National Park[3]:

July 23, 1996

12:30 am	Report of overdue hiker
04:30 am	Fly search teams to walk trails and beaches for missing hiker
10:30 am	Missing hiker found
01:00 pm	Hiker and search teams are out of canyon
01:00 pm	Call from Phantom Ranch (inner canyon) 10 year old male with CPR in progress. Victim is flown to clinic where he dies. While at clinic, called to another heat stroke emergency (52 year old female). 2 more requests for service that afternoon and evening.
09:30 pm	Last rescue completed. Debriefing for death begins. (Note: inner canyon temperature was 114 degrees F)

Are these numbers simply an expected outcome of increased visitation? Many experts do not believe so. If they are correct, then why are so many recreationists getting into trouble in the great outdoors?

[1] Brower, David. (1967). *Gentle Wilderness. The Sierra Nevada*. San Francisco: Sierra Club. p. 153.
[2] PARKNET: The National Park Service Place on the Web. (1997). World Wide Web address: http://www.nps.gov/.
[3] BackCountry Ranger Page. (1998). World Wide Web address: http://www.grand-canyon.az.us.

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Increased Exposure, Arrogance and Ignorance

Anyone who is evenly remotely aware of today's communication media cannot help but notice the exposure that outdoor activities receive. Today outdoor recreation is used to market a myriad of products and services including automobiles, clothing, restaurants, soft drinks, and investment services just to name a few. But what do these advertisements communicate? In many cases they show participants who are ill equipped and poorly attired taking outlandish risks. A recent advertisement for a climbing shoe reads, "No rules, no regulations, no qualifying rounds, no teams, no uniforms, no trophies, no spectators. Just you (and some boots)." The climber is shown climbing a severe pitch without a rope or any other safety equipment.[4] While such feats may be within the capabilities of climbing's elite, most search and rescue professionals would not recommend free solo climbing for the average weekend participant. Do such advertisements encourage similar behavior from casual participants? It is difficult to believe that they do not. This author had the psychologically taxing task of helping in the evacuation of a 16 year old climber who had fallen 35 feet fracturing his pelvis and his spinal column in the lumbar region. The only equipment he possessed was a pair of technical climbing shoes. Unfortunately, his prognosis was not good and he may never walk again.

In addition to advertisements, potential "weekend warriors" are presented with a wide variety of outdoor sports on television. Some are quite responsible such as the highly acclaimed Public Television series *Trailside*. This series has examined a variety of outdoor activities always emphasizing the importance of training, knowledge, planning and preparedness. On the other hand, one must wonder what is really being communicated by televised events such as EcoChallenge where competitive teams are encouraged to push beyond their limits and where immediate rescue is but a radio call away. On a recent broadcast of this event, one team continued to compete even though one of their members had to be carried up a mountain side because she had torn her Achilles tendon. What does this communicate to the average participant about good judgment? A recent interview with Grand Teton National Park climbing rangers offered this advice,

> Well, above all, it's knowing when to turn around. The people who are most afraid to quit are the people who get hurt. Everyone's into goal-setting these days. They wake up in the morning and say, 'I'm going to do this.' It's not just up to you. You have to factor in weather, route finding, altitude. You have to be constantly evaluating.
>
> The goal for hikers should just be getting out there, not making it to a summit or to some lake 100 miles down the trail. Just being up in the mountains should be enough.[5]

The Grand Teton climbing rangers make another point. Even with all of the available courses, rental equipment, videos and literature, many people are going into the mountains lacking even the most basic skills and equipment. Further, for many who do have the equipment, they seem to lack the knowledge necessary to use it. Jim Springer believes that part of the problem lies in the fact that many participants have omitted the "apprenticeship period."[6] He believes that in the past many outdoor enthusiasts learned their skills from wilderness veterans. Other people had made mistakes and survived and novices could learn from them without having to make the same mistakes themselves. He now observes that many recreationists just "jump right into participation" with

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[4] Huffman, M. G. and Fickle, J.E. (1996). "What Is the Message in the Medium? Mixed Signals for National Park and Wilderness Users." In *Proceedings of the 1996 International Conference on Outdoor Recreation and Education (ICORE)*. S. Guthrie, J. Macke, and R. Watters (Eds.). Boulder: The Association of Outdoor Recreation and Education (AORE). p. 89.

[5] Jenkins, M. (1994). "Backcountry 911". *Backpacker*. 22(4). p. 92.

[6] Ibid.

very little training. Indeed, many seem to rely on technology and others for their safety and well being.

Another controversial issue is the increased use of cellular phones in the backcountry. A recent editorial in *Backpacker* addressed the dilemma.[7] While it is true that cellular phones have been used to launch SAR operations for legitimate reasons, they have also been used by individuals who were only momentarily disoriented and should have been able to deal with the situation on their own. Many people who would let their fingers do the walking simply do not understand the enormous costs involved in launching many rescue operations not to mention the potential dangers to SAR personnel who are called out on false alarms. As search and rescue expert Herb Kincey observed, "As more and more people carry telephones in the backcountry, there are going to be cases where rescue personnel evaluate the situation and simply decide not to launch a rescue."[8] There is another potential problem for individuals who rely on the technology of the cell phone. What will they do if stranded in a deep canyon, are out of range or have low batteries?

Contributing Factors for Accidents in Specific Environments

Alpine Environments

While good judgment, and overall preparedness cannot be over stressed as prerequisites for travel into any backcountry environment, there are hazards unique to certain environments that can contribute to injury or even death. Mountains are among the most popular settings for outdoor activities and yet can prove to be among the most variable. What can at one minute can be a warm, clear day can in the next become a life threatening environment. As climbing ranger Jim Springer observes, many of the visitors he sees in Grand Teton National Park have "No mountain sense whatsoever. So many people just don't respect the mountains. They don't know that they can die out here."[9] He also notes that many who go into the mountains carry absolutely no gear and many who do have packs have bookbags that cannot contain enough equipment to ensure survival if forced to bivouac overnight. A list of equipment recommended by the climbing rangers for day hikes in the mountains is presented in Table 1.[10]

Table 1. Recommended Equipment for Mountain Day Hike.

- Day Pack - 2,000 cubic inches with foam
- Headlamp
- Pocket Knife
- Candle - short for starting fires
- Iodine - for water purification
- Toilet Paper
- Mittens
- Waterproof Shell - Top & Bottoms
- Mirror - for signaling
- Map and Compass
- Sunglasses and Sunscreen
- Waterproof Matches /Lighter
- Water Bottle - 1 liter min.
- First Aid Kit
- Hat - warm that covers ears/neck
- Fleece Jacket
- Long Johns - synthetic
- Bivy Sack

An examination of the accident trend data gathered by the American Alpine Club also sheds some light on contributing factors to accidents in alpine environments. Figure 1 shows a definite increase in the number of climbing related accidents occurring in North America, but particularly for the United States.

[7] "The Call from the Wild". (1996). *Backpacker*. 24(1). p.13.
[8] Ibid.
[9] Jenkins, M. (1994). "Backcountry 911". *Backpacker*. 22(4). p. 86.
[10] Ibid.

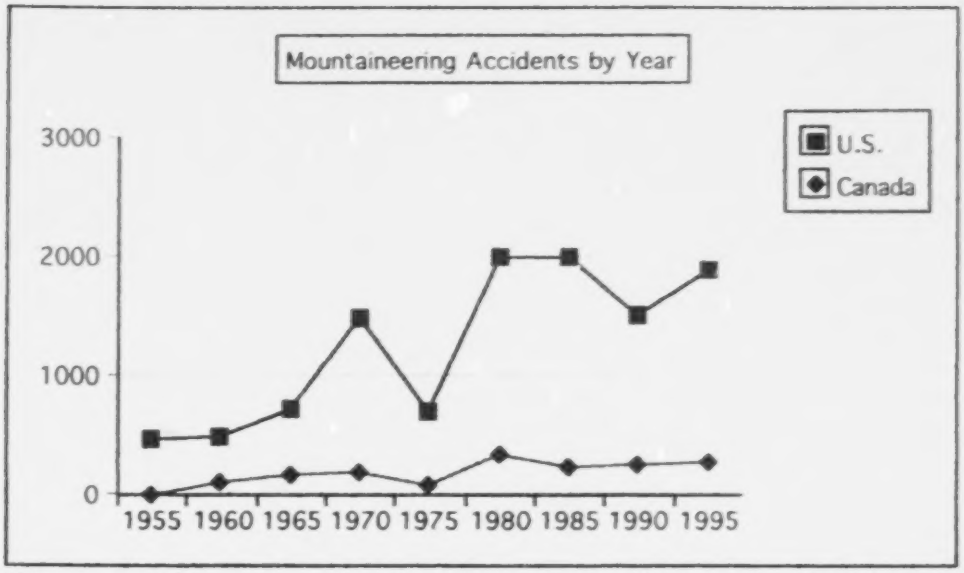

Figure 1. Mountaineering Accidents in North America by Year for the U.S. and Canada.[11]

Figure 2 presents the most common primary causes of accidents in mountaineering. It is interesting to note that falls on rock and snow and falling objects are the most common primary causes of accidents followed by exceeding abilities, a judgment factor.

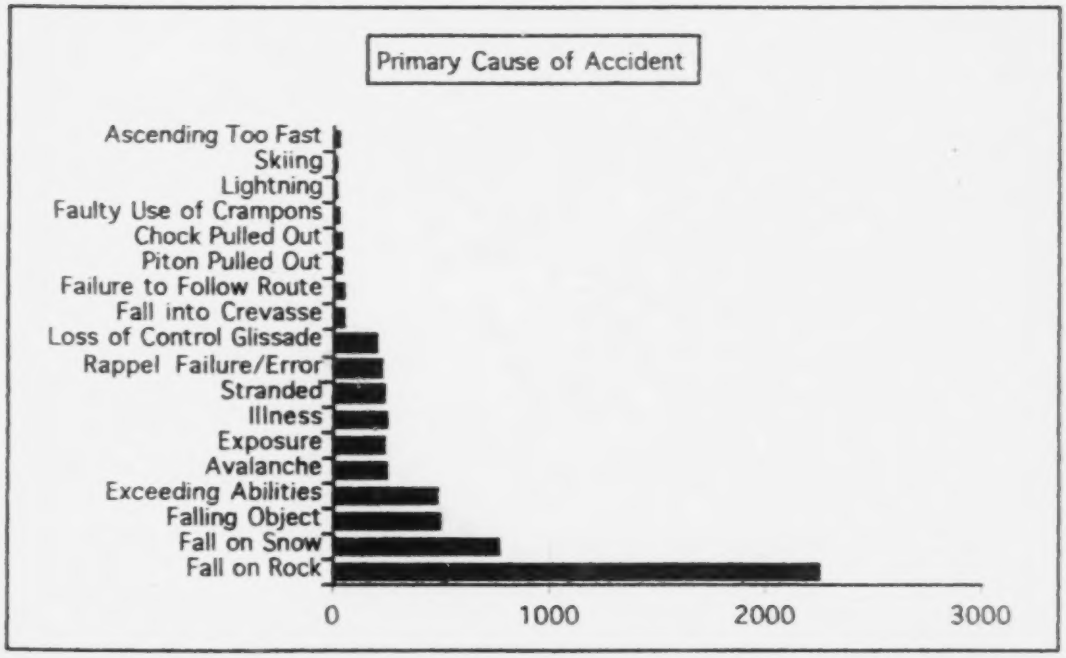

Figure 2. Primary Causes of Mountaineering Accidents in the U.S.[12]

It should be noted that rarely are accidents attributed to a single cause. Figure 3 presents secondary

[11] American Alpine Club. (1998). Mountaineering Accidents Webpage. http://www.bme.jhu.edu/~peter/climbing/ANAM/ANAM.html.

[12] Ibid.

causes of mountaineering accidents in the United States.

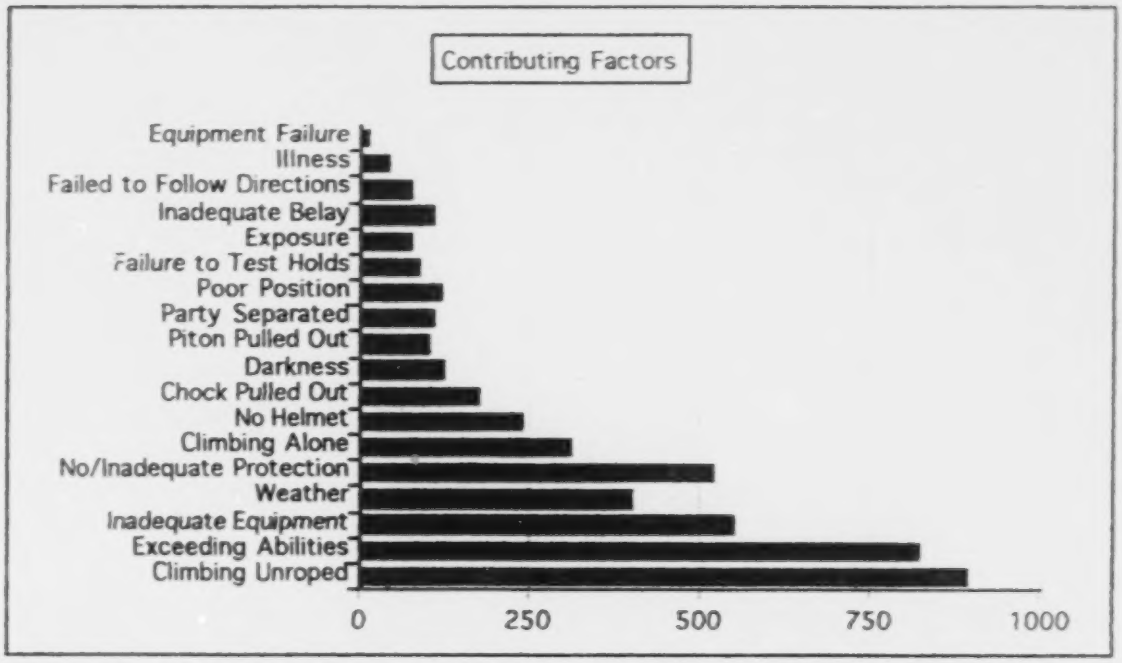

Figure 3. Secondary Factors of Mountaineering Accidents in the U.S.[13]

It is interesting to note the large number of judgmental factors in this list including the top three contributing factors: climbing unroped, exceeding abilities, and inadequate equipment.

Finally, research on age and mountaineering accidents suggests that educational efforts should be directed toward climbers who are 21 to 25 years of age followed by those who are 15 to 20.

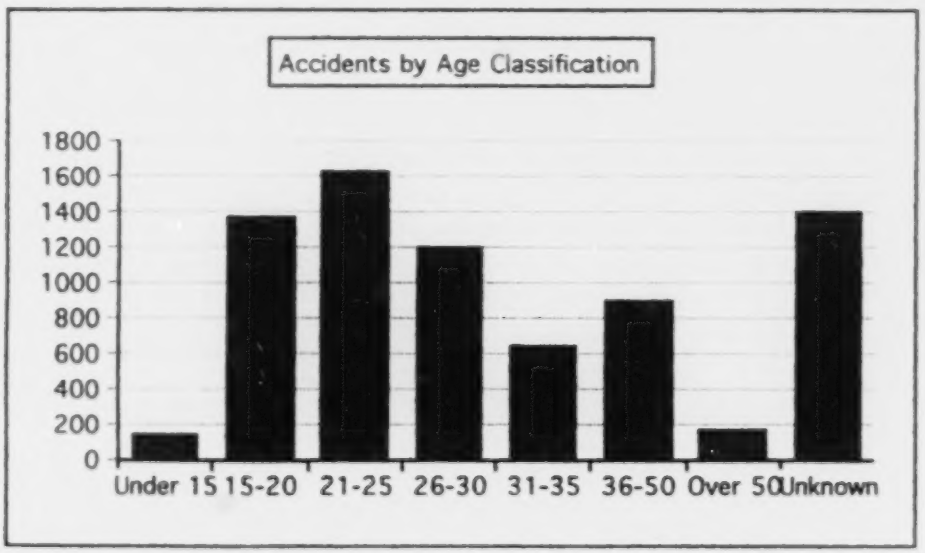

Figure 4. Mountaineering Accidents by Age Classification.[14]

[13] Ibid.
[14] Ibid.

Desert Environments

Increasingly, outdoor recreationists are discovering the desert environment as a source of adventure and new areas to explore. Unfortunately, many are discovering more than they bargained for. As an example within recent years, the Grand Canyon National Park has been averaging over 400 rescues and medical emergencies a year.[15] Many hikers who are not used to desert environments are caught off guard. Table 2 presents a list of precautions to help hikers avoid problems with desert travel.

Table 2. Precautions for Hiking in the Desert.[16]

- The importance of eating is underestimated by many novice desert hikers. Your body needs calories to help keep you cool in the heat and to replace electrolytes (salts) that your body loses through perspiration. Eat more food than normal in small amounts throughout the day that are rich in complex carbohydrates (i.e. breads, fruits, crackers, low fat energy bars, etc.).

- Drink water (and preferably electrolyte replacement drinks) frequently and before you become thirsty. If you feel thirsty, you are already dehydrated. In extremely hot, dry conditions, it is possible to sweat one half to one quart of water and electrolytes per hour. A minimum amount of water per person per day in the desert is one gallon. In addition, your body can only absorb about one quart of fluid per hour so you must drink small amounts of liquids frequently.

- Wait for the shade. This is particularly important if you are walking uphill. In extremely high temperatures, you will overheat if you walk uphill in direct sunshine.

- Stay wet and cool. Carry some extra water to wet your hair and clothing. Place a wet bandana in your hat or on your neck. Evaporation will help to cool your body. Clothing will dry in 10 to 15 minutes, so you will have to soak it several times during the course of the hike.

- Every one half to one hour, sit down and put your legs up above the level of your heart. Such a break can flush out approximately 20 to 30 percent of the waste products that build up in your legs. Eat something and drink some fluids. These breaks will not slow you down in the long run.

- Do not "huff and puff". Walk at an aerobically efficient pace (one in which you can walk and talk). Walk at a faster pace and you will deplete your body's energy reserves more rapidly and you will produce more waste products.

- Do not exceed your normal level of physical activity and training.

Winter Environments

Increasingly, Americans are beginning to discover backcountry activities in the winter. However, what might be an inconvenience during a summer backcountry trip can become life threatening during the winter. Beyond the obvious threats of hypothermia and frostbite, winter campers must be prepared for hazards unique to this time of year.

[15] BackCountry Ranger Page. (1998). World Wide Web address: http://www.grand-canyon.az.us.

[16] Ibid.

Table 3 identifies some precautions for guarding against some common winter hazards.[17]

Table 3. Precautions for Winter Camping.

- Beware of cold metal and supercooled liquids such as stove fuel. Both can cause instant frostbite in sub zero temperatures.

- Avalanche danger is a particular concern for western areas. Check weather forecasts as well as avalanche forecasts for indications of the danger level. Take an avalanche course from a reputable school. Be aware of your route and potential slide areas. Wear transceivers and carry shovels and probes.

- Make sure your tent is adequate for the conditions and not likely to collapse from snow loading.

- Be aware of "widow makers" tree limbs that could break and crush a tent when subjected to high winds or snow loading.

- Be careful when using stoves. Spilled fuel can cause instant frostbite and stoves used in tents or snow caves pose a major threat for carbon monoxide poisoning.

- Drink plenty of fluids. Many individuals dehydrate when they are out in the winter because they do not feel thirsty. Check the color of your urine (it should be light yellow) to determine if you are drinking enough fluids. Dehydration greatly increases the chances you will succumb to hypothermia and/or frostbite.

- Do not be too ambitious with regard to the distances you plan to travel. Many new winter campers are surprised by early sunsets and darkness. To estimate the amount of daylight you have left, hold your hand with your fingers together and horizontal to the horizon. Count the number of fingers between the horizon and the sun. Multiply the number of fingers times 15 minutes to estimate the amount of daylight you have left.

White Water

Finally, it should be noted that water sports continue to remain among the most popular activities for Americans when they go outdoors. Likewise, this environment is not immune to participants engaging in behaviors that put themselves and others at risk. The American Whitewater Affiliation offers some insight into accident trends for whitewater boaters and techniques that might reduce the number of accidents in the future.[18] An analysis of over one hundred whitewater fatalities revealed that the "top three killers of experienced white water paddlers were: pins (25%), long swims (25%) and swimming into entrapments (15%)."[19]

As a result of their findings, they make the following recommendations. First and foremost, participants must honestly consider their limits and abilities before considering a difficult descent. Related to concept of participants engaging in an "apprenticeship" that was addressed earlier in this paper, the American Whitewater Affiliation observes that, "In recent years many new boaters have progressed to advanced status rapidly, accomplishing in months what used to take years.

[17] Curtis, Rick. (1998). *Outdoor Action Guide to Winter Camping*. World Wide Web address: http://www.princeton.edu/~oa/wintcamp.html.

[18] American Whitewater Safety. (1998). *American Whitewater Safety*. World Wide Web address: http://www.rahul.net/awa/awa/safety/index.html.

[19] Ibid.

Unfortunately, their river reading skills and their appreciation of the dangers inherent in running difficult, technical white water is often limited by their lack of experience."[20] Second, kayakers should have a "100% bomb proof roll." Finally, all boaters should be trained to deal with emergency situations. The American Whitewater Safety Committee has published a set of waterproof flash cards for use in emergency situations. Some of the topics included are: river rescue, z-lines, harnesses, knots, medical treatment of the injured, hypothermia, survival shelters, and techniques for signally rescuers and helicopters. It should be noted that these cards should be viewed as an adjunct aid in emergency situations and should not be a viewed as a substitute for training.[21]

Possible Outcomes and Recommendations

Statistics from a variety of sources indicate that the number of search and rescue operations in U.S. park and recreation areas is continuing to grow. Further, it appears that this increase is larger than what could be explained by growing numbers of outdoor enthusiasts alone. Beyond the obvious moral implication of saving human life, there is an ominous trend in the number of individuals and their heirs bringing law suits against land management agencies when there is loss to life or limb. In many instances, this loss was due to poor judgment on the part of the plaintiff. Consider the following:

> . . .hikers in Grand Teton National Park become lost descending 11,938 foot Buck Mountain; one died of hypothermia. A lawsuit was launched claiming that park officials didn't institute rescue quickly enough. The plaintiff argued that park officials have an obligation to require safety equipment, to test the competency of each climber, and to "clear" the mountains of all climbers before dark. The park properly balked. Superintendent Stark argued that they hadn't the manpower or funds to carry out such functions, but perhaps more important: "The inherent dangers of mountain climbing are patently obvious;" and "many park visitors value backcountry climbing as one of the few experiences free from government regulation or interference."[22]

Such attitudes leave little doubt that many believe that their safety in the wilderness should be the responsibility of government and not themselves. Many land management agencies are in a dilemma with regard to search and rescue operations. It has been estimated that the average mountain search and rescue operation costs $25,000.[23] Many agencies are simply finding it difficult to afford such operations. As a result, legislatures have entertained a variety of possible new laws to curtail the high cost of SAR operations. Some of these have included:

- Billing victims for rescue costs
- Mandating that each hiker purchase a "hiker's license" before entering mountain trails
- Slapping an excise tax on hiking equipment, the proceeds going to a rescue fund
- Requiring each hiker to carry an electronic device that will signal his location if lost[24]

Unfortunately, some agencies have even considered closing areas for which they cannot provide search and rescue services.

What are some possible solutions? In the wilderness, perhaps more than in many other

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[20] Ibid.

[21] Wallbridge, C. and Sundmacher, W. A. Sr. (1995). *Whitewater Rescue Manual*. Camden, ME: Ragged Mountain Press. p. 9.

[22] Waterman, L. and Waterman, G. (1993). *Wilderness Ethics*. Woodstock, VT: The Countryman Press. p. 158.

[23] Ibid.

[24] Ibid. p. 153.

environments, knowledge is power. But more than simply teaching techniques, wilderness visitors must learn to develop good judgment. They must learn to objectively critique their own abilities and weaknesses and then be able to set reasonable goals for their wilderness trips. Perhaps Grand Teton climbing ranger Scott Birkenfield summed up the importance of good judgment best,

> I had to do a study of all the backcountry accidents in (Grand) Teton National Park recently. A total of 700 injuries and deaths. That's a lot of hurt people. You know what I found? Just one, just one, wasn't due to pilot error. All the others--whether it was bad judgment, or bad planning or lack of gear or the wrong gear or not knowing how to use the gear or whatever--all 699 were a direct result of pilot error.[25]

Without increased responsibility among wilderness sport participants, and a decrease in the number of search and rescue operations, legislation may steal the freedom of the hills from all of us.

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[25] Jenkins, M. (1994). "Backcountry 911". *Backpacker*. 22(4). p.93.